AMENDMENT TO THE CLAIMS:

Please cancel claim 7 without prejudice and please amend claims 1, 5, 8, 13, 20 and 21 as follows:

1. (Currently amended) A brushless electric machine comprising:

a stator and a rotor spaced from the stator to define a radial air gap relative to an axis of rotation for the rotor, the rotor having a core portion of magnetic flux conducting material;

a rotor having an axis of rotation and having pairs of rotor pole portions of opposite polarity disposed at least partly around a circumference of the rotor and having axially projecting extensions projecting from at least one end of the rotor toward a secondary air gap;

at least one stationary excitation coil assembly for receiving direct current from an external source and being positioned across the secondary air gap so as to induce a direct current component of flux in the rotor pole portions which increases a resultant flux in the radial air gap when said direct current is of a first polarity and which reduces resultant flux in the radial air gap when said direct current is of a second polarity opposite said first polarity; and

wherein permanent magnet (PM) material is disposed between the rotor pole portions and is also disposed between rotor pole portions of one polarity and ~~a~~ the core portion of the rotor for containing the direct current component of flux in the rotor pole portions as the direct current component of flux is conveyed to the radial air gap and for inhibiting the direct current component of flux from leaking from said pole portions prior to reaching the radial air gap when said direct current is of the first polarity.

2. (Previously presented) The machine of claim 1, further comprising a second stationary excitation coil assembly for receiving direct current from an external source and being positioned across a second secondary air gap from said rotor.

3. (Original) The machine of claim 2, wherein each stationary, excitation coil assembly includes a coil supported by a core that is made of iron, steel or another iron alloy.

4. (Original) The machine of claim 2, wherein each stationary, excitation coil assembly includes a coil supported by a core that is made of a compressed powder material having ferromagnetic properties.

5. (Currently amended) The machine of claim 1, wherein said rotor has a body portion that is cylindrical except for longitudinally extending grooves, wherein PM material is disposed in said grooves and wherein pole pieces are disposed in said grooves over the PM material to form a cylindrical rotor with axially extending poles of alternating polarity on a rotor circumference that are separated by PM material; and

wherein the direct current component of flux is initially conveyed axially through the pole pieces before being conveyed to the radial air gap.

6. (Previously presented) The machine of claim 5, wherein said rotor body portion has slits along an axial direction for reducing harmonics losses.

7. (Canceled) ~~The machine of claim 1, further comprising pole extensions extending from said at least one end of the rotor and an end ring attached to said pole extensions to provide a magnetic path to the secondary air gap, and said end rings have pole pieces corresponding to said pole extensions.~~

8. (Currently amended) A brushless electric machine comprising:

a stator and a rotor spaced from the stator to define a radial air gap relative to an axis of rotation for the rotor;

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a rotor having an axis of rotation and having pairs of rotor pole portions of opposite polarity disposed at least partly around a circumference of the rotor and having axially projecting extensions projecting from at least one end of the rotor toward a secondary air gap;

at least one stationary excitation coil assembly for receiving direct current from an external source and being positioned across the secondary air gap so as to induce a component of flux in the rotor pole portions which increases a resultant flux in the radial air gap when said direct current is of a first polarity and which reduces resultant flux in the radial air gap when said direct current is of a second polarity opposite said first polarity; and

wherein permanent magnet (PM) material is disposed between the rotor pole portions and is also disposed between rotor pole portions of one polarity and a core portion of the rotor for containing the component of flux in the rotor pole portions as the component of flux is conveyed to the radial air gap and for inhibiting the component of flux from leaking from said pole portions prior to reaching the radial air gap when said direct current is of the first polarity;

further comprising pole extensions extending from said at least one end of the rotor and an end ring attached to said pole extensions to provide a magnetic path to the secondary air gap, and said end rings have pole pieces corresponding to said pole extensions; and

~~The machine of claim 7,~~ wherein said pole pieces have stepped flanges for connecting to the pole extensions and wherein the flanges are made of a plurality of stacked laminations.

9. (Original) The machine of claim 1, wherein the machine is brushless AC synchronous machine.

10. (Original) The machine of claim 1, wherein the machine is a brushless DC machine.

11. (Original) The machine of claim 1, wherein the machine is a motor.

12. (Original) The machine of claim 1, wherein the machine is a generator.

13. (Currently amended) A method of controlling flux in a brushless electrical machine, the method comprising:

inducing a first flux in a rotor from a stator across a radial air gap by conducting a current in a primary excitation winding on the stator;

positioning a first excitation coil at one end of the rotor;

conducting a direct current through the first excitation coil so as to produce a second flux in the rotor across at least one axial air gap and to produce a resultant flux in radial air gap resulting from the first flux and the second flux;

providing portions of permanent magnet (PM) material between poles in the rotor and between poles of one polarity and a core portion of the rotor, which is of generally cylindrical shape, <u>and which is made of flux-conducting material</u>, ~~so as to~~ <u>the portions of PM material acting to contain</u> the second flux as said second flux is conveyed to the radial air gap and to prevent leakage of the second flux <u>to the core of</u> ~~in~~ the rotor before reaching the radial air gap; <u>and</u>

conducting a direct current of a first polarity through the first excitation coil, so as to increase resultant flux in the radial air gap~~; and~~

~~conducting a direct current of a second polarity through the first excitation coil so as to weaken resultant flux in the radial air gap~~.

14. (Original) The method of claim 13, wherein said second flux has a first component that is controlled in the rotor by current in the first excitation coil and further

comprising conducting a direct current through a second excitation coil at an opposite end of the rotor from the first excitation coil, so as to induce a second component of said second flux across a second axial air gap.

15. (Original) The method of claim 13, wherein the machine is operated as a brushless AC synchronous machine.

16. (Original) The method of claim 13, wherein the machine is operated as a brushless DC machine.

17. (Original) The method of claim 13, wherein the machine is operated as a motor.

18. (Original) The method of claim 13, wherein the machine is operated as a generator.

19. (Original) The method of claim 13,

forming the rotor with a body portion that is cylindrical except for longitudinally extending grooves,

disposing PM material in said grooves, and

disposing pole pieces in said grooves over the PM material to form a cylindrical rotor with axially extending poles of alternating polarity on a rotor circumference that are separated by PM material.

20. (Currently amended) A method of controlling flux in a brushless electrical machine, the method comprising:

inducing a first flux in a rotor from a stator across a radial air gap by conducting a current in a primary excitation winding on the stator;

positioning a first excitation coil at one end of the rotor;

conducting a direct current through the first excitation coil so as to produce a second flux in the rotor across at least one axial air gap and to produce a resultant flux in radial air gap resulting from the first flux and the second

flux;

providing portions of permanent magnet (PM) material between poles in the rotor and between poles of one polarity and a core portion of the rotor, which is of generally cylindrical shape, so as to contain the second flux as said second flux is conveyed to the radial air gap and to prevent leakage of the second flux ~~in~~ the rotor before reaching the radial air gap;

conducting a direct current of a first polarity through the first excitation coil, so as to increase resultant flux in the radial air gap;

conducting a direct current of a second polarity through the first excitation coil so as to weaken resultant flux in the radial air gap;

~~The method of claim 13, further comprising~~

providing pole extensions extending from at least said one end of the rotor~~,~~;

attaching an end ring to said pole extensions to provide a magnetic path to the axial air gap~~,~~; and

wherein said end rings have pole pieces corresponding to said pole extensions, said poles pieces having stepped flanges for connecting to the pole extensions in a manner to withstand rotational forces encountered during operation of the machine.

21. (Currently amended) The method of claim 20, further comprising forming the flanges ~~from~~ with a plurality of stacked laminations.